

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of )

Federal-State Joint Board on )  
Universal Service )

Forward-Looking Mechanism )  
for High Cost Support for )  
Non-Rural LECs )

CC Docket No. 96-45

CC Docket No. 97-160

**RECEIVED**  
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OFFICE OF THE SECRETARY

**JOINT COMMENTS OF BELL SOUTH CORPORATION, BELL SOUTH  
TELECOMMUNICATIONS, INC., U S WEST, INC., AND  
SPRINT LOCAL TELEPHONE COMPANIES  
TO FURTHER NOTICE OF PROPOSED RULEMAKING  
SECTIONS III.C.5, 7, 8 & III.D PLATFORM  
III.B.3 & III.C ALL INPUTS AND IV AND V**

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& III.C ALL INPUTS IV. AND V.**

**I. INTRODUCTION AND SUMMARY**

BellSouth Corporation, BellSouth Telecommunications, Inc., U.S. West, Inc. and Sprint Local Telephone Companies ("BCPM Joint Sponsors") hereby file their Fourth set of Comments in response to the Commission's July 18, 1997, Further Notice of Proposed Rulemaking seeking comment "on the mechanism we should adopt to estimate the forward-looking economic costs that non-rural LECs would incur to provide universal service in rural, insular, and high cost areas. . . ."<sup>1</sup>

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<sup>1</sup> *In the Matter of Federal-State Joint Board on universal Service, Forward-Looking Mechanism for High Cost Support of Non-Rural LECs*, CC Docket Nos. 96-45 and 97-160, Further Notice of Proposed Rulemaking, FCC 97-256, released July 18, 1997 ¶ 2 ("FNPRM").

In this, the fourth stage of the proceeding, the BCPM sponsors offer their views on the remaining issues identified in the FNPRM. In prior rounds of comments, the BCPM sponsors have described the following aspects of their new and enhanced model<sup>2</sup>:

- The enhanced BCPM will incorporate a switching module that includes the use of efficient host/remote switching arrangements. In addition, it will incorporate new transport and signaling algorithms based on efficient state-of-the-art technology. Beta versions of the Transport and Signaling modules have been provided for examination and comment. These Beta versions can be viewed at the BCPM 2.0 web site at [www.bcpm2.com](http://www.bcpm2.com). We anticipate providing a Beta version of the new switching module very soon.
- The enhanced BCPM addresses concerns regarding customer location identified in the FNPRM by utilizing more precise customer data than the Census Block Group (CBG) level employed by previous versions of the BCPM and Hatfield models. The enhanced BCPM uses household and business line data at the Census Block (CB) level, in conjunction with data regarding the road network to more accurately locate customers. Thus this enhanced approach yields a more accurate determination of costs in the sparsely populated rural high-cost areas.
- The enhanced BCPM incorporates a loop design process that generates an efficient, state-of-the-art, forward-looking loop plant architecture that allows customers to enjoy access to advanced telecommunications services as directed by the 1996 Act. By utilizing a "grid square" approach and the proven Carrier Serving Area (CSA) architecture, the Model provides a means of accurately estimating costs in all areas of the United States.

As stated in the Commission's Universal Service decision<sup>3</sup>, the focus in this phase of the continuing universal service inquiry is on the selection of the appropriate "platform"

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<sup>2</sup> The BCPM sponsors will be introducing the enhanced BCPM in two phases. In October 1997, the sponsors introduced a version of the Model, BCPM 2.0, which introduced the new customer location and loop algorithms integrated with the remaining algorithms in BCPM 1.1. In early November 1997, the BCPM sponsors intend to introduce BCPM 3.0 which will incorporate the new switching, transport, signaling, expense, capital costs, and reporting modules and a new user interface with the new customer location and loop modules to produce a superior tool for the analysis and targeting of high-cost support.

for the development of a proxy model for the determination of universal service costs.

Both the BCPM and Hatfield sponsors have devoted virtually all of their efforts in recent months to the refinement of their model platforms to be responsive to the Commission's and Joint Board's directions in the development of proxy models. As a result, the BCPM sponsors have devoted few, if any, resources to the refinement and documentation of the input factors to the model(s). Indeed, the timetable established in the Universal Service decision anticipates that once the model platform is selected at the end of 1997, the Commission, Joint Board and other parties will shift their efforts to the subject of appropriate inputs to the selected model. Consequently, our comments here are limited to the remaining platform issues identified in the FNPRM:

- The feasibility of developing a "hybrid" model, incorporating aspects of both models,
- The inclusion of a wireless alternative in the network design process, and
- The degree to which the models should incorporate local usage in the development of universal service costs.

## **II. HYBRID MODELS**

In the FNPRM, the Commission encourages the developers of both models to "...refine their models by incorporating portions of the other's model...". The BCPM sponsors believe that we have been responsive to this request. To facilitate comparison of the models, we have incorporated the Hatfield density bands, metrics of lines per square mile (vs. households per square mile used in the initial BCPM), and description of the

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<sup>3</sup> *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report and Order, FCC 97-157, released May 8, 1997 ("Universal Service Order").

feeder and distribution components of the network. The BCPM sponsors have also attempted to place as many model variables as possible in input files or Excel formulas that can be modified by the user.

While, in theory, virtually any modification can be made to the models to incorporate revised logic or algorithms, in practice many such modifications are difficult, time and resource consuming, and fraught with the potential for errors unless the underlying structure and variables of the models are thoroughly understood, and carefully integrated.

Within this proceeding, two alternatives to the BCPM algorithms have been offered: the ideas offered by the Hatfield sponsors for customer location and network design, and the ideas in these two areas offered by the FCC staff. We address the two parties suggested modifications separately below.

#### **A. HATFIELD**

During the course of the comments in this FNPRM, and the open discussion meetings and workshops which the Joint Board Staff has held to discuss issues related to proxy modeling<sup>4</sup>, the Hatfield sponsors have introduced three new concepts into their model:

1. Geocoding of customer locations
2. Identification of "clusters" of customers
3. "Strand-mapping" of distribution facilities.

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<sup>4</sup> *Weekly Meetings on Forward-Looking Cost Mechanism for Universal Service*, CC Docket Nos. 96-45 and 97-160, Public Notice, released August 22, 1997.

We will comment on each of these.

# 1. GEOCODING OF CUSTOMER LOCATIONS

In our comments in the second phase of this FNPRM proceeding, the BCPM sponsors stated that an accurate geocoding of customer locations held great promise for increasing the accuracy of proxy cost models<sup>5</sup>. Unfortunately, we found, as did the Hatfield sponsors, that customers in the very high cost rural areas are particularly hard to locate with present geocoding resources. Customers in urban locations can be accurately located with address data. However, rural customers, for whom high-cost funding is critically important to preserve affordable telephone service, are often listed under “rural route” or “Post Office Box” listings which provide no clue as to where customers are actually located. Hatfield’s own data shows that in rural areas less than half of all customers can be accurately located.<sup>6</sup> By locating all (low cost) urban customers, and only a fraction of the (high cost) rural customers, this process imposes an unreasonable and dangerous bias towards understating costs for rural, insular and high-cost customers.

The use of the Hatfield methodology for locating customers in the context of this proxy model proceeding is further complicated by the fact that the database used by Hatfield as the source for their location data is proprietary, and cannot be inspected by other parties for accuracy or completeness. This is contrary to the basic principles established by the Commission for proxy models.<sup>7</sup>

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<sup>5</sup> Joint Sponsors’ Comments filed September 2, 1997.

<sup>6</sup> Hatfield Sponsors’ Ex Parte filed September 3, 1997.

<sup>7</sup> Universal Service Order, ¶ 250.

The BCPM sponsors reiterate their previous recommendation in this proceeding that the FCC announce a date certain when carriers wishing to obtain high-cost funding must submit geocoded locations for all of their customers. However, given the size, complexity and cost of such an undertaking, the BCPM sponsors do not believe that this task could be completed before 2001.

## 2. CLUSTERING

The Hatfield sponsors suggest that once customers are "located", that "clusters" of customers would be determined for the design of feeder and distribution plant. The BCPM sponsors are at somewhat of a handicap, however, in commenting on this proposal since, other than illustrative drawings of "clustering", the Hatfield sponsors have not provided the design rules and logic for the automated compilation of customer clusters for all areas in the continental United States and its insular areas. Furthermore, it is unclear how this clustering information is translated into usable network design information.

The BCPM sponsors have submitted a reasonable approach to customer location and outside plant design which relies on publicly available census information and business location information, road data, and grid-cells designed consistent with the CSA network architecture, to reasonably approximate the cost of serving all customers. In its present form, it would appear technically impossible and, as a policy matter, undesirable, to incorporate the vague Hatfield clustering algorithm in the BCPM model.

## 3. STRAND MAPPING

Other than generalized conceptual descriptions and illustrations, we know nothing of the method by which the cost of distribution plant (where the bulk of the cost of



constructing a local network is found) would be calculated under the Hatfield strand mapping proposal. Furthermore, the concept of designing a telephone network by “connecting the dots” or finding the “shortest piece of string” that connects all customers (or at least those which Hatfield has found on their mailing lists) is inappropriate. This is not the way telephone networks are built. Aside from the unreasonableness of the “as the crow flies” concept of plant placement, a real telephone company must stand ready to serve all customers, wherever they request service in the service territory, on several days notice. This concept would not be compatible with the BCPM architecture.

In summary, the BCPM developers contend that it is neither feasible nor desirable to blend these aspects of the enhanced BCPM with the proposed Hatfield 5.0 model for the following reasons.

One of the many virtues of the BCPM is the integration of customer location with outside plant engineering. Using CB data on housing units and business lines, coupled with road network information, micro grids are aggregated to a size that is consistent with a forward-looking least cost technology, namely the CSA. This CSA architecture consists of a single Digital Loop Carrier (DLC) site which may have more than one DLC, that serves non-empty quadrants composed of Distribution Areas. Thus, the enhanced BCPM locates customers more precisely and efficiently engineers the network to provide basic service to those customers. Given this integration of the customer location module and network design, attempts to carve up these two integrally related pieces and replace either the customer location module or the basic network design would erode one of the most favorable features of the enhanced BCPM.

In addition, the BCPM developers maintain that the attributes of the enhanced BCPM's customer location and loop design modules are superior to those modeled in Hatfield. For example, when Hatfield assigns customers to locations based on CB data, it places customers subjectively along the perimeter of the CB. Often CB perimeters are made up of rivers and railroad tracks. This approach is inferior to the enhanced BCPM's approach which uses the road network to determine customer location within the CB. The Hatfield model uses an inappropriate 1500 ohm loop design standard which necessitates the use of an extended range line card which is twice the cost of a standard POTS line card.<sup>8</sup> This is not a least cost approach. The enhanced BCPM limits copper loop lengths so that all customers can be served using a standard POTS line card. Thus, we believe that the enhanced BCPM offers superior location and loop design methodologies.

## **B. THE FCC STAFF PRESENTATIONS**

The FCC staff sponsored two workshops where they offered suggestions for the design of algorithms for the location of customers and the design of outside plant<sup>9</sup>:

### **1. DR. MARK KENNET**

Dr. Kennet presented a grid-cell based architecture which, in conjunction with census data at the CB level, could be used to locate customers and serve as the basis for the design of customer serving arrangements. As stated in our comments on his

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<sup>8</sup> BCPM Ex Parte filed October 9, 1997.

<sup>9</sup> *Workshops on Forward-Looking Cost Mechanisms for Universal Service Support for Non-Rural Carriers*, September 3 and September 11, 1997, CC Docket Nos. 96-45 and 97-160, Public Notice, DA 97-1870, released August 28, 1997.

presentation<sup>10</sup>, we believe Dr. Kennet's approach is similar to that employed in the enhanced BCPM. Our principal concern is that Dr. Kennet's approach utilizes a grid which is approximately 18,000 ft on a side, while the grid in the enhanced BCPM is 12,000 ft. We selected the 12,000 ft size since it is consistent with the CSA network design guidelines.<sup>11</sup> The enhanced BCPM design architecture locates the DLC remote terminal at the "road centroid" of the grid which allows the most efficient deployment of distribution facilities, and precludes extending plant beyond the CSA design limits.<sup>12</sup> This would assure that all customers receive service of a quality consistent with industry standards, and that customers have access to advanced telecommunications services as required by the 1996 Act.

As we understand Dr. Kennet's approach, the remote terminal would be placed at the center of the grid, or multiple remote terminals could be placed within the grid. We are concerned that placing the remote terminal at the center of the grid could cause more distribution plant to be engineered than would be necessary to serve customers. It is also unclear under what circumstances, and under what guidelines, multiple remote terminals would be placed in the grid.

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<sup>10</sup> Joint Sponsors' Comments Regarding the September 3, 1987 Workshop filed September 10, 1997.

<sup>11</sup> BCPM Ex Parte filed October 9, 1997.

<sup>12</sup> *Id.*

## **2. DR. VAKUNTH GUPTA**

Dr. Gupta presented an approach to outside plant design which also had many similarities to the methodology employed by the enhanced BCPM. Our primary concern with Dr. Gupta's proposal is the use of HDSL technology to serve customers who are isolated in remote areas. Similar to our concern with the Hatfield proposal to use T-1 lines with repeaters, we are concerned that Dr. Gupta's use of HDSL for this function would not be the appropriate forward-looking least cost technology solution for serving these customers.

## **III. WIRELESS SOLUTIONS**

As was evident in the discussion of wireless alternatives for the provision of basic universal service which occurred at the open discussion meeting of October 8, 1997<sup>13</sup>, there are many questions which remain to be answered prior to the incorporation of a wireless alternative into the proxy model for the determination of high-cost support.

Among the issues remaining to be resolved are:

- How to account for the availability and cost of scarce spectrum resources?
- What amount of local usage should be included in the basic cost calculation for basic service?
- How to account for the differences between the traditional landline pricing model, where only originating usage is charged, and the wireless model where the customer is charged for both originating and terminating usage?
- How to design the wireless equipment to take into consideration the various situations of customer distance, density and terrain factors? (Wireless systems entail "line-of-sight" type design requirements which require an analysis of terrain factors which are not present in the landline model, and have not been built into the data bases and design architectures of the present models.)

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<sup>13</sup>

Airtouch Ex Parte filed October 10, 1997.

- Should a wireless solution ultimately prove to be less costly than a landline system, how should regulators deal with the stranded investment of incumbent carriers who have made good-faith investment in landline facilities to serve remote rural customers?

The BCPM and Hatfield models have evolved to their present state over a period of several years. This evolution necessitated the investment of substantial resources. It seems reasonable to expect that the capability to analyze and model wireless network alternatives will involve a similar learning process. While the BCPM sponsors support continued research into the modeling of wireless networks, we recommend that in order to comply with the January 1, 1999 deadline for implementation of the explicit funding process for non-rural LECs, that the model be based on the landline model.

#### **IV. LOCAL USAGE**

A network is built to be used by customers. Thus, any model which determines the cost of basic telephone service must also incorporate the costs of some basic level of usage. This process is complicated by the fact that for most Americans, the predominant basic residential service offering is flat-rated, providing unlimited local usage for a fixed price. Indeed, the regulatory history of the past two decades shows that attempts by incumbent carriers to introduce measured local residential offerings are met with fierce opposition by consumer groups, state legislators and regulators.

The BCPM sponsors have addressed this issue by using current average local usage levels in the design of the DLC, switching, signaling and transport portions of the network. We believe that this adequately reflects the costs of local usage. The bulk of the costs of a wireline network consist of copper loops whose cost is not sensitive to the level

of usage. However, as noted in the previous section, any expansion of the model to include network architectures such as wireless, where the costs are much more sensitive to usage and the traditional pricing plans have incorporated a usage charge, would have to carefully consider the usage level utilized in a basic universal service offering.

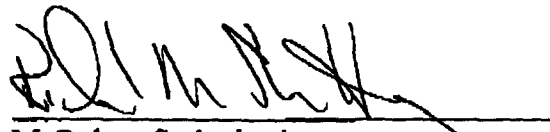
## **V. CONCLUSION**

The BCPM Joint Sponsors believe that these Comments will further assist the Commission to compare and contrast the structure proposed by the two models. Furthermore, these Comments demonstrate the undesirability of blending the BCPM 2.0 model with the proposed Hatfield 5.0 model.

Respectfully submitted,

**BELLSOUTH CORPORATION  
BELLSOUTH TELECOMMUNICATIONS, INC.**

By:



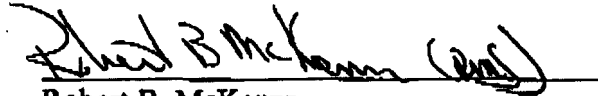
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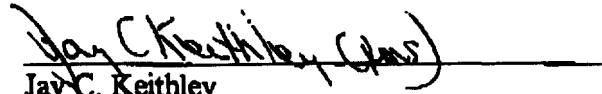
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**CERTIFICATE OF SERVICE**

I hereby certify that I have this 17th day of October, 1997 served all parties to this action with a copy of the foregoing **JOINT COMMENTS OF BELL SOUTH CORPORATION, BELL SOUTH TELECOMMUNICATIONS, INC., U S WEST, INC., AND SPRINT LOCAL TELEPHONE COMPANIES TO FURTHER NOTICE OF PROPOSED RULEMAKING SECTIONS III.C.5, 7, 8 & III.D PLATFORM III.B.3 & III.C ALL INPUTS AND IV AND V** by placing a true and correct copy of the same in the United States Mail, postage prepaid, addressed to the parties listed on the attached service list.

  
Juanita H. Lee



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